

(350 in-lb) of energy, whichever results in the greater force, in accordance with the frame test, §1512.18(k)(2), without visible evidence of fracture or frame deformation that significantly limits the steering angle over which the wheel can be turned. Sidewalk bicycles are exempt from this section.

**§ 1512.15 Requirements for seat.**

(a) *Seat limitation.* No part of the seat, seat supports, or accessories attached to the seat shall be more than 125 mm (5.0 in.) above the top of the seat surface at the point where the seat surface is intersected by the seat post axis.

(b) *Seat post.* The seat post shall contain a permanent mark or ring that clearly indicates the minimum insertion depth (maximum seat-height adjustment); the mark shall not affect the structural integrity of the seat post. This mark shall be located no less than two seat-post diameters from the lowest point on the post shaft, and the post strength shall be maintained for at least a length of one shaft diameter below the mark.

(c) *Adjustment clamps.* The seat adjustment clamps shall be capable of securing the seat in any position to which it can be adjusted and preventing movement of the seat in any direction under normal conditions of use. Following the road test, §1512.18(p) (or the sidewalk bicycle proof test, §1512.18(q), as applicable), the seat clamps shall be tested in accordance with the seat adjustment clamps and load test, §1512.18(l).

**§ 1512.16 Requirements for reflectors.**

Bicycles shall be equipped with reflective devices to permit recognition and identification under illumination from motor vehicle headlamps. The use of reflector combinations off the center plane of the bicycle (defined in §1512.18(m)(2)) is acceptable if each reflector meets the requirements of this section and of §1512.18 (m) and (n) and the combination of reflectors has a clear field of view of  $\pm 10^\circ$  vertically and  $\pm 50^\circ$  horizontally. Sidewalk bicycles are not required to have reflectors.

(a) *Front, rear, and pedal reflectors.* There shall be an essentially colorless front-facing reflector, essentially

colorless or amber pedal reflectors, and a red rear-facing reflector.

(b) *Side reflectors.* There shall be retroreflective tire sidewalls or, alternatively, reflectors mounted on the spokes of each wheel, or, for non-caliper rim brake bicycles, retroreflective wheel rims. The center of spoke-mounted reflectors shall be within 76 mm (3.0 in.) of the inside of the rim. Side reflective devices shall be visible on each side of the wheel.

(c) *Front reflector.* The reflector or mount shall not contact the ground plane when the bicycle is resting on that plane in any orientation. The optical axis of the reflector shall be directed forward within  $5^\circ$  of the horizontal-vertical alignment of the bicycle when the wheels are tracking in a straight line, as defined in §1512.18(m)(2). The reflectors and/or mounts shall incorporate a distinct, preferred assembly method that shall insure that the reflector meets the optical requirements of this paragraph (c) when the reflector is attached to the bicycle. The front reflector shall be tested in accordance with the reflector mount and alignment test, §1512.18(m).

(d) *Rear reflector.* The reflector or mount shall not contact the ground plane when the bicycle is resting on that plane in any orientation. The reflector shall be mounted such that it is to the rear of the seat mast with the top of the reflector at least 76 mm (3.0 in) below the point on the seat surface that is intersected by the line of the seat post. The optical axis of the reflector shall be directed rearward within  $5^\circ$  of the horizontal-vertical alignment of the bicycle when the wheels are traveling in a straight line, as defined in §1512.18(m)(2). The reflectors and/or mounts shall incorporate a distinct, preferred assembly method that shall insure that the reflector meets the optical requirements of this paragraph (d) when the reflector is attached to the bicycle. The rear reflector shall be tested in accordance with the reflector mount and alignment test, §1512.18(m).

(e) *Pedal reflectors.* Each pedal shall have reflectors located on the front and rear surfaces of the pedal. The reflector elements may be either integral with

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the construction of the pedal or mechanically attached, but shall be sufficiently recessed from the edge of the pedal, or of the reflector housing, to prevent contact of the reflector element with a flat surface placed in contact with the edge of the pedal.

(f) *Side reflectors.* Reflectors affixed to the wheel spokes shall be mounted either flat on the spokes or within the spoke cage such that the angle between the optical axis and the normal to the plane of the wheel shall not exceed the angle of the spokes with the plane of the wheel. The reflectors shall not interfere with any wheel adjustments. The side-mounted reflector devices shall be essentially colorless or amber on the front wheel and essentially colorless or red on the rear wheel.

(g) *Reflector tests.* The pedal, front-mount, rear-mount, and side-mount reflectors shall be tested in accordance with the reflector test, §1512.18(n), to assure the reflectance values over the angles given in tables 1 and 2.

(h) *Retroreflective tire sidewalls.* When retroreflective tire sidewalls are used in lieu of spoke-mounted reflectors, the reflecting material shall meet the following requirements:

(1) The retroreflective material shall form a continuous circle on the sidewall.

(2) The retroreflective material shall adhere to the tire such that after the tire has been subjected to a temperature of 50° ±3 °C (122° ±5.4 °F) for 30 minutes, the retroreflective material cannot be peeled or scraped away without removal of tire material.

(3) The retroreflective material shall be as resistant to abrasion as is the adjacent sidewall material so that when retroreflective material is removed from the inflated tire by abrasion with a wet, steel bristle brush, tire material will be removed along with the retroreflective material.

(4) The retroreflective material shall be tested for performance in accordance with the retroreflective tire test, §1512.18(o), to assure the reflectance properties over the angles given in table 3. When a portion of the retroreflective material is selected (and the remainder is masked as specified in §1512.18(o)(2)(i)), the selected portion shall not contact the ground

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plane when the assembled bicycle is resting on that plane in any orientation.

(i) *Retroreflective rims.* When retroreflective rims are used in lieu of spoke-mounted reflectors or retroreflective tire sidewalls, the reflecting material shall meet the following requirements:

(1) The retroreflective material shall form a continuous circle on the rim.

(2) If the retroreflective material is applied to the rim in the form of a self-adhesive tape, the following requirement must be met: Use a sharp knife, razor blade, or similar instrument to carefully release an end of the tape material sufficient to be grasped between the thumb and finger. Grasp the freed tape end and gradually pull in a direction 90° to the plane of the rim. The tape material must break before additional separation (peeling) from the rim is observed.

(3) After the retroreflective material is abraded in accordance with the abrasion test for retroreflective rims at §1512.18(r), the rim must then be tested for performance in accordance with the retroreflective tire and rim test at §1512.18(o), to assure the reflectance properties over the angles given in table 3.

[43 FR 60034, Dec. 22, 1978, as amended at 45 FR 82627, 82628, Dec. 16, 1980]

### § 1512.17 Other requirements.

(a) *Road test.* Bicycles, other than sidewalk bicycles, shall be ridden at least 6.4 km (4.0 mi.) by a rider weighing at least 68.1kg (150 lb.) and travel five times over a 30.5 m (100 ft.) cleared course in accordance with the road test, §1512.18(p), and shall exhibit stable handling, turning, and steering characteristics without difficulty of operation. There shall be no system or component failure of the structure, brakes, or tires, and there shall be no loosening or misalignment of the seat, handlebars, controls, or reflectors during or resulting from this test.

(b) *Sidewalk bicycle proof test.* Sidewalk bicycles shall be dropped a distance of at least 300 mm (1.0 ft.) three times onto a paved surface with weights attached in accordance with the sidewalk bicycle proof test, §1512.18(q). There shall be no fracture